Perception and Acceptance of COVID-19 Vaccination among Patients in a Tertiary Hospital in South-East Nigeria

A. I. Apakama[1,2*], C. C. Uzozie[1,2], M. C. Amobi[1], M. C. Okosa[1,2] and A. A. Onwuegbuna[1,2]

[1]*Guinness Eye Centre, Onitsha, Nigeria.*
[2]*Department of Ophthalmology, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Aims: To determine the perception and acceptance of COVID-19 vaccination among patients in a tertiary eye hospital.
Study Design: A cross-sectional hospital-based study.
Place and Duration of Study: Guinness Eye Centre Onitsha, South-East Nigeria between 1st to 29th June 2021
Methodology: An interviewer-administered semi-structured pretested questionnaire on sociodemographic, knowledge, perception and acceptance on coronavirus disease and its vaccine was used to collect data on eligible patients. Data obtained was analyzed with SPSS version 23 (IBM Corporation, Armonk, NY, USA). Descriptive statistics including frequency tables, mean and standard deviation was used to present categorical variables.
Results: A total of 386 patients were interviewed comprising 157 (40.7%) males and 229(59.3%) females, and aged 18 to 93 years (mean age of 44.73±18.49 years). Two hundred and fifty-eight (66.8%) patients knew of COVID-19 vaccine availability in Nigeria, with 90 (34.9%) not knowing

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Corresponding author: E-mail: akunneapakama@yahoo.com;

where they could obtain the vaccine. Only 34 (8.8%) had taken the vaccine. Uptake of COVID-19 vaccine is strongly associated with patient's perception of COVID-19 being real (P=0.006), patients trust in the information head about the vaccine (P=0.001), and their trust on the efficacy and safety of the COVID-19 vaccine (P<0.001). Acceptance of COVID-19 vaccine is not significantly associated with their faith in the previous human vaccinations(P=0.076).

Conclusion: The uptake of COVID-19 vaccine in the study group is low. Therefore, there is an urgent need for re-strategizing on various ways to enlighten the public and widen the scope of information dissemination.

1. INTRODUCTION

The Coronavirus Disease 2019 (COVID-19) was first reported in Wuhan, China in late 2019, [1] and rapidly became a pandemic affecting most countries of the world by the end of the year 2020. It is caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Globally, as at the July 24th 2021, there were 192,284,207 confirmed cases of COVID-19, including 4,136,518 deaths [2]. Following the enormous loss of human lives, and with most countries' health systems being overwhelmed, there was an urgent need to wedge the transmission of the virus [3]. Several non-pharmacologic interventions (NPIs) were adopted including enforcing the use of face masks, hand washing, social distancing, travel restrictions, schools' closures, and partial or complete lockdowns. This idea stemmed from the successful use of NPIs in dealing with past pandemics and smaller outbreaks as seen during the plague and the 1921 influenza pandemic [4,5,6]. These measures helped in controlling the pandemics. A combination of NPIs including social distancing, quarantine, traffic restriction and universal symptom survey were temporally associated with the control of COVID-19 in Wuhan, China [7]. Another Chinese study demonstrated that there would have been a 65-fold increase in COVID-19 outbreak if not for the use of NPIs [8] The deployment of NPIs in Europe was reported to have prevented over 3 million deaths across the 11 countries of the continent [9]. A hospital based study in Nigeria reported a third of the population adhered to the use of NPIs only because it is mandatory in the country [10]. Despite the widespread use of NPIs in most countries to slow down the progression of the disease, the most specific measure to contain the pandemic and reduce the mortality and morbidity rates remains the use of effective, safe, and affordable antiviral agents and vaccines [11]. Although the United States Food and Drug Administration (FDA) has granted Remdesivir an Emergency Use Authorization for severely ill hospitalized patients with COVID-19,11 the World Health Organization (WHO) recommended against its use in November 2020 [12].

The use of vaccines over the years as a public health intervention have proven to be the most reliable and cost-effective way of saving millions of lives [13,14]. There are now several vaccines that are in use against COVID-19. The first mass vaccination programme started in early December 2020. At least 13 different vaccines (across 4 platforms) have been administered: the Pfizer/BioNtech Comirnaty vaccine was listed for WHO Emergency Use Listing (EUL) on 31 December 2020. The SII/Covishield and AstraZeneca/AZD1222 vaccines (developed by AstraZeneca/Oxford and manufactured by the State Institute of India and SK Bio respectively) were given EUL on 16 February 2021. The Janssen/Ad26.COV 2.S developed by Johnson & Johnson, was listed for EUL on 12 March 2021. The Moderna COVID-19 vaccine (mRNA 1273) was listed for EUL on 30 April 2021 and the Sinopharm COVID-19 vaccine was listed for EUL on 7 May 2021. The Sinopharm vaccine is produced by Beijing Bio-Institute of Biological Products Co Ltd, subsidiary of China National Biotec Group (CNBG) [15]. It is predicted that achieving herd immunity by widespread COVID-19 vaccination will put an end to the pandemic [16]. The threshold for SARS-CoV-2 herd immunity is estimated to range between 50% and 67% [17]. Many people have doubts about vaccine safety, and this is going to be a major challenge to be resolved by health care providers, policymakers, community leaders, and governments to increase the widespread acceptance of the vaccines [18].

Nigeria with an estimated population of 200 million people (as at July 24 2021) has recorded 170,306 confirmed cases and 2,130 deaths due to COVID-19 [19]. The country commenced

COVID-19 vaccination following the arrival of 3.94 million doses of the AstraZeneca/Oxford vaccine, manufactured by the Serum Institute of India (SII), from Mumbai to Abuja on March 2 2021 [20]. The arrival of the COVID-19 vaccine had enabled the National Primary Health Care Development Agency (NPHCDA) to commence the vaccination of Nigerians in priority groups, starting with the frontline healthcare workers and the general populace. Hence, it is crucial to explore the perception and acceptance of the COVID-19 vaccines and its predictors among the Nigerian population. The findings of this study should assist the policymakers to design and undertake proactive measures by highlighting the importance of vaccination in the community and encouraging vaccine uptake.

2. METHODOLOGY

2.1 Study Design

Cross-sectional study.

2.2 Study Site

Guinness Eye Centre, Onitsha.

2.3 Study Duration

1st to 29th June 2021 (four weeks).

This study was carried out on eye patients attending the Guinness Eye Centre, Onitsha, South Eastern Nigeria which is a tertiary eye hospital offering a wide range of ophthalmic services.

The study population consists of participants aged 18 years and above. The survey is a cross-sectional study design with a minimum sample size of 386 calculated based on the assumption of a 50% vaccine acceptance rate, a 3% margin of error and a confidence interval of 95%.

Serial sampling was employed whereby eligible patients were selected from a list of attendance at the out-patient on each clinic day. Patients under 18 years of age, and those non-consenting to this study were not eligible. Data was collected using a semi-structured interviewer-administered questionnaire consisting of the following sections: consent, sociodemographic, knowledge, perception and acceptance of COVID-19 vaccination.

Data analysis was carried out using SPSS version 23 (IBM Corporation, Armonk, NY, USA) Descriptive statistics including frequency tables, mean and standard deviation was used to present categorical variables. Dichotomized responses were presented as proportions.

Information on the study was provided as the first section of the survey. Confidentiality was strictly maintained as names were not required, and data was accessible only to the researchers. Adherence to the tenets of the Declaration of Helsinki was strictly observed.

3. RESULTS

Three hundred and eighty-six patients were interviewed. Their ages ranged from 18 to 93 years, mean of 44.73 ± 18.49 years; median of 41 years and modal age of 30 years. There were 229 (59.3%) females and 157 (40.7%) males. The male to female ratio was approximately 1:1.5. Ninety-one (23.6%) persons were above 60 years of age. The sociodemographic characteristics of the patients is shown in Table 1. Traders and professionals constituted approximately half (50.8%) of the study population, with a few, 20 (5.2%) being civil servants and farmers. There was no significant statistical difference between patients who were gainfully employed in males and females (P= 0.798). On educational status, majority, 289(75.0%) patients had at least secondary education, while only 25(6.5%) patients had no formal education. Majority, 236 (61.2%) were married, while 31 (8.0%) were widowed.

There were 355 (92.0%) patients who had received vaccine before the COVID pandemic, with 346 (89.6%) of them having no bad experience with it. Out of the 9(10.4%) patients who had bad experiences with previous vaccine, pain and rashes at the site of injection were experienced in 6 (75%) and 3 (25%) patients respectively. On COVID vaccine, 367 (95.1%) have heard of the vaccine through various channels of communication (Fig. 1). Majority, 262 (67.9%) of the patients trusted the information received through these channels. There was strong correlation between persons who trusted the information received about COVID-19 vaccine with age below 60 years (P=0.046), sex (P<0.001), and having up to tertiary education (P<0.001), but no significant association with employment status(P=0.152).

Table 1. Sociodemographic characteristics of patients

	Male (%)	Female (%)	Total (%)
Age			
≤20	6(1.5)	13(3.4)	19(4.9)
21-30	40(10.4)	59(15.3)	99(25.7)
31-40	25(6.5)	44(11.4)	69(17.9)
41-50	26(6.7)	39(10.1)	65(16.8)
51-60	16(4.1)	27(7.0)	43(11.1)
61-70	19(4.9)	29(7.5)	48(12.4)
71-80	16(4.15)	16(4.15)	32(8.3)
80+	9(2.4)	2(0.5)	11(2.9)
Total	**157(40.7)**	**229(59.3)**	**386(100.0)**
Occupation			
Trader*	57 (14.8)	81 (21.0)	138 (35.8)
Professional*	18 (4.7)	40 (10.3)	58 (15.0)
Retired	24 (6.2)	27 (7.0)	51 (13.2)
Student	24 (6.2)	26 (6.8)	50 (13.0)
Artisan*	20 (5.2)	18 (4.6)	38 (9.8)
Unemployed	4 (1.0)	20 (5.2)	24 (6.2)
Civil servant*	5 (1.3)	8 (2.1)	13 (3.4)
Farmer*	1 (0.3)	6 (1.5)	7 (1.8)
Others*	4 (1.0)	3(0.8)	7 (1.8)
Total	**157 (40.7)**	**229 (59.3)**	**386 (100.0)**
Education			
Non- formal education	8 (2.1)	17 (4.4)	25 (6.5)
Primary	38 (9.9)	34 (8.8)	72 (18.7)
Secondary	55 (14.3)	77 (20.0)	132 (34.3)
Tertiary	56 (14.5)	101 (26.2)	157 (40.7)
Total	**157 (40.7)**	**229 (59.3)**	**386 (100.0)**
Marital status			
Single	55 (14.2)	64 (16.6)	119 (30.8)
Married	96 (24.9)	140 (36.3)	236 (61.2)
Widowed	6 (1.6)	25 (6.4)	31 (8.0)
Total	**157 (40.7)**	**229 (59.3)**	**386 (100.0)**
Residence			
Urban	94 (24.4)	137 (35.5)	231 (59.9)
Semiurban	41 (10.6)	56 (14.5)	97 (25.1)
Rural	22 (5.7)	36 (9.3)	58 (15.0)
Total	**157 (40.7)**	**229 (59.3)**	**386 (100.0)**

Gainfully employed.

Table 2. Age and sex distribution of COVID vaccinated patients

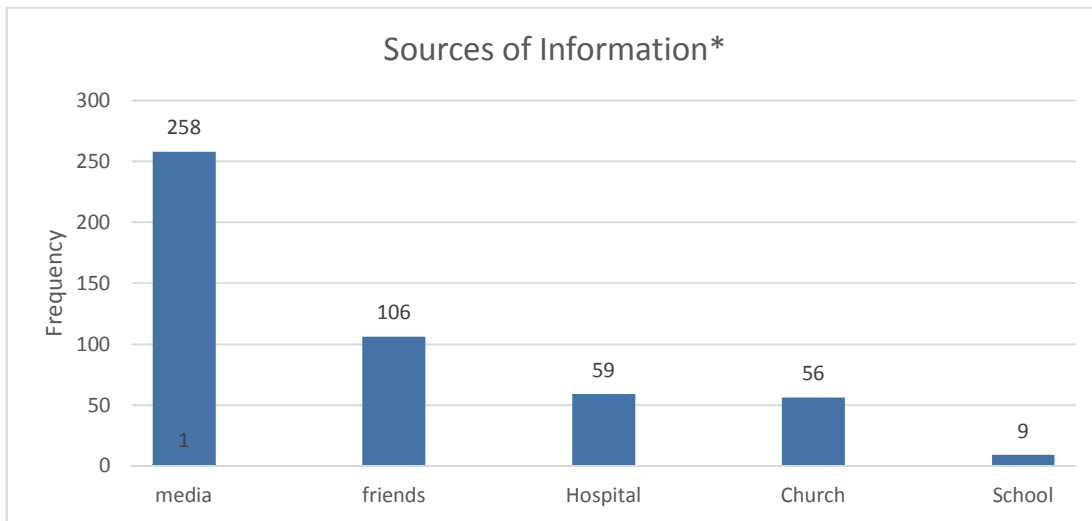| Age (years)	Male (%)	Female (%)	Total (%)
≤ 20	1(1.5)	1(3.4)	2(5.9)
21-30	6(10.4)	5(15.3)	11(32.3)
31-40	3(6.5)	4(11.4)	7(20.6)
41-50	1(6.7)	2(10.1)	3(8.8)
51-60	2(4.1)	2(7.0)	4(11.8)
61-70	0(4.9)	2(7.5)	2(5.9)
71-80	2(4.15)	2(4.15)	4(11.8)
80+	1(2.4)	0(0.5)	1(2.9)
Total	**16(47.1)**	**18(52.9)**	**34(100.0)**

$\chi^2=3.461$, df=7, P=0.839

Fig. 1. Sources of Information on COVID-19
*78(20.2%) participants gave multiple answers

There were 258 (66.8%) patients who knew the COVID vaccine was available in Nigeria, with 90 (34.9%) not knowing the exact location to obtain the vaccine. Various locations recorded on where to receive the vaccines were health centres and hospitals 153 (91.0%); local government 4 (2.4%), churches 4(2.4%), offices 4(2.4%), schools 2(1.2%) and traditional ruler's palace 1(0.6%). Two hundred and twenty-six persons (58.5%) do not trust the vaccine, while 160 (41.5%) trusted the COVID-19 vaccine. Of those who trusted the COVID-19 vaccine, 119(74.38%) trusted its efficacy and safety, while 22 (13.75%) trusted its efficacy only, and 19 (11.86%) trusted its safety only. Amongst the patients who did not trust the vaccine, multiple responses were obtained for their sources of distrust and these included their personal feeling 192(85.0%), and various information disseminated through channels like social media 39(17.3%), friends 16(7.1%), family members 8(3.5%), and the church 1(0.4%). Source of distrust from personal feeling was strongly associated with at least tertiary level of education (P=0.007), while distrust source from social media is strongly associated with at least tertiary level of education (P=0.002) and gainful employment (P=0.042). Other sources of distrust were not significantly associated with the sociodemographic of the patients. The reasons for distrust were safety reasons 156(69.0%), death 40(17.7%), rapid emergence of COVID-19 vaccine 25(11.1%), population control 25 (11.1%) and sterility 19(8.4%). On statistical significance, fear of death was the only reason of distrust that was strongly associated with sociodemographic (gainful employment) of the patients (P=0.034).

Thirty-four (8.8%) patients had received the COVID vaccine. They were 16 (47.1%) males and 18 (52.9%) females. The age and sex distribution of these patients is shown in Table 2.

On marital status, 16 (47.1%) patients were married, 16 (47.1%) were single, and 2 (5.8%) were widowed. Majority, 20 (58.8%) of the patients who had received the vaccine resided in urban area, while semiurban and rural areas accounted for 8 (23.5%) and 6 (17.7%) respectively. Eighteen (52.9%) were gainfully employed, while 16 (47.1%) were not gainfully employed. Amongst those who were not gainfully employed 8 (50.0%) were retired, 7 (43.75%) were students in tertiary institutions, and 1 (6.25%) was unemployed. On highest educational level, 24 (70.6%) had at least tertiary education, 5 (14.7%) had secondary education, 3 (8.8%) had primary education and 2 (5.9%) had no formal education. There was a positive correlation in persons who had at least tertiary education with COVID vaccine reception (P<0.001), with no statistically significant difference between age group above 60 years (P=0.667), sex (P=0.427), and employment status (P=0.055).

Three hundred and twenty-one (83.2%) patients recorded that COVID-19 was real. Of these, 162 (50.5%) knew where to get the vaccine, but only 34 (10.6%) had already taken the vaccine.

Factors correlated with the uptake of COVID-19 vaccine is shown in Fig. 2. Uptake of COVID vaccine is strongly associated with the patient's perception of COVID being real (P=0.006), patients trust on the information heard about the vaccine (P=0.001), and their trust on the efficacy and safety of the COVID vaccine(P<0.001). Uptake of COVID vaccine is not significantly associated with their faith in the previous human vaccinations (P=0.076).

Of the 352 patients who had not received the vaccine, 19 (5.4%) have not heard of the COVID vaccine; 61 (17.3%) had intention of receiving the vaccine, of which 10 (16.4%) did not know where to obtain the vaccine; and 272 () had no

intention of taking the vaccine. Patients who had not received the COVID vaccine were asked why they haven't received it, and their responses are shown in Table 3.

Fifty-one patients who knew that covid is real and where to obtain the vaccine, had no intention of taking the vaccine. Reasons they gave for not needing the vaccine include having confidence in their immunity to fight COVID 19 (37.3%), being okay with the previous vaccine received 11(21.6%), COVID vaccine offers no form of protection 9(17.6%), fear in different forms 6(11.8%), not confident on the authenticity of the vaccine 4(7.8%), and no reason 2(3.9%).
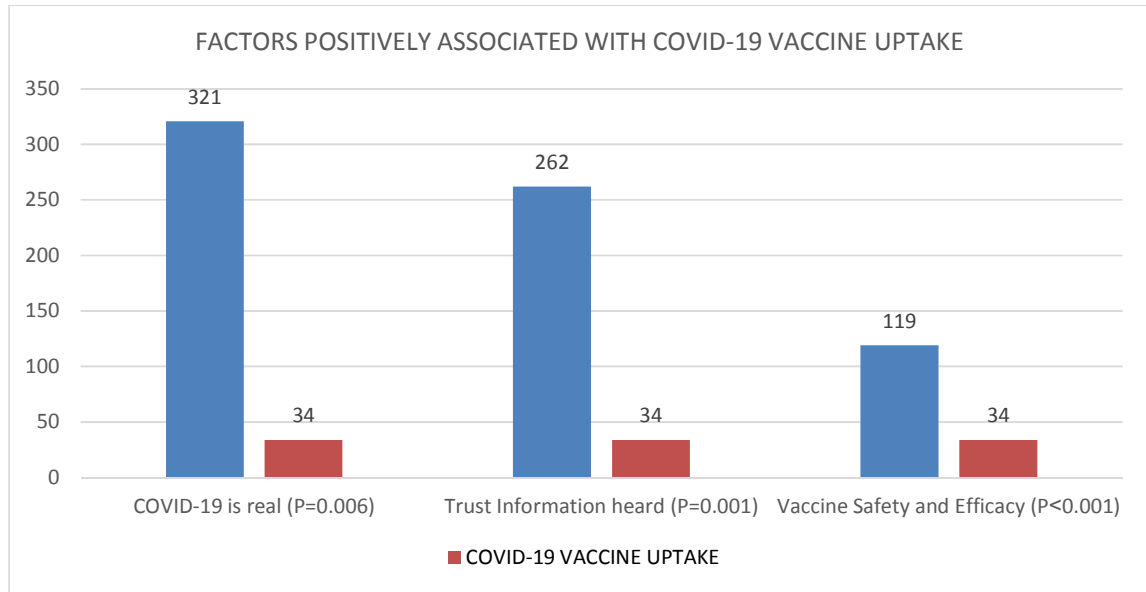

Fig. 2. Factors associated with the uptake of COVID-19 uptake

Table 3. Reasons for not receiving the COVID vaccine

Reason for not receiving the COVID vaccine	Frequency (%)
Confidence on my immunity	56(15.9)
I'm okay with the previous Immunization received	40(11.4)
I have intention to receive the vaccine but I don't have access to it	38(10.8)
COVID vaccine offers no protection	32(9.1)
Fear*	20(5.7)
I have intention to receive the vaccine but there's no urgency for it	19(5.4)
Not confidence on the authenticity of the vaccine	15(4.3)
I don't feel like taking the vaccine	11(3.1)
No need for the vaccine, COVID-19 is not real	8(2.3)
God will protect me	2(0.5)
Not available**	111(31.5)
Total	**352 (100.0)**

*Fear includes fear of death, fear of adverse reaction and fear of being injected the COVID-19 virus.
**includes 19(17.1%) who haven't heard of the vaccine and 92(82.9%) who had no reason

4. DISCUSSION

Eye disease patients may represent an approximate microcosm of the general population. The demographic pattern of the patients in this study was similar to that reported in a global study involving respondents from 19 countries, and a Jordanian study [21,22]. Females were proportionately more, and majority of the participants being less than 55 years. The use of on-line survey was cited to have contributed to the higher number of younger participants in both studies. However, in this study which was physical, the stay-at-home order still observed by some older patients contributed to their small number. Nigeria is known to have a large youthful population with the under 35-year-olds contributing above 70% [23].

Although, Nigeria is not among the top COVID-19 affected countries with total confirmed cases and deaths of 170,306 and 2,130 respectively, and case fatality rate of 1.3% as at July 24, 2021 (first case was reported on February 27, 2020) about 83.2% of the patients acknowledged existence of the COVID-19 disease. This awareness is at par with the proportion living in the urban and semi-urban areas (85.0%) and those with minimum of elementary formal education (75.0%). These are assumed to have basic understanding and access to information channels. It is possible that the respondents who reported the non-existence of the disease were influenced by various narratives of conspiracy especially in states that recorded no confirmed cases several months after the index case. This was partly due to non-testing for COVID-19. This study demonstrated that uptake of the COVID-19 vaccine is strongly associated with the patient's perception of COVID being real (P=0.006). A survey done at the early months of Coronavirus pandemic involving both Jordanians and Iraqis reported awareness levels of 56.8% and 53.2% respectively [24]. Information concerning the existence of the COVID vaccine was championed by the media as shown by 66.8% of the patients whom the media informed about the vaccine out of the 95.1%. Similar findings were noted by various authors [25,26]. The Nigeria Centre for Disease Control (NCDC) utilizes various media platforms in disseminating information and updates to the masses [19]. Although the NPHCDA had reported utilization of 3.92million doses of COVID vaccine as at July 24 2021 (representing 98% of the 4million doses that arrived), it is worth noting that one – third of the respondents who knew of the availability of

COVID vaccine did not know of the exact location to get vaccinated [20]. It is likely the content of the information passed to the public did not address the question of location, and could negatively affect vaccine uptake. Similarly, the nature of some pieces of information passed through the media especially the social media was pointed out as responsible for the low level of trust on the vaccine. This is shown by 58.5% of the respondents not trusting the vaccine. Areas of their distrust stemmed from personal feelings and social media messages. More recently, the magnetic theory of COVID-19 vaccine purported by the anti-vacccinationists had impacted on the youths who mostly use the social media platforms. Historically, people had embraced vaccination programs which led to marked reduction or eradication of illnesses such as yellow fever, measles, polio and other childhood diseases [27]. This fact is corroborated by 92.0% of our patients who had received various vaccines prior to onset of the COVID pandemic with 90% of them having no bad experience. However, uptake of COVID-19 vaccine is not significantly associated with their faith in the previous human vaccine (P=0.076).

It is likely the trust factor played a major role. In Jordan, El-Elimat et al reported that similar low trust had resulted from factors such as: frustration of the public on the government handling of the pandemic; social media campaign by anti-vaccinationists fueled by the new technology (mRNA-based vaccine) and short span of vaccine development [22]. The vaccine acceptance by our respondents was low at 23.6%, consisting of those who intend to get the vaccine (14.8%) and already vaccinated patients (8.8%). Although, similar to the Jordanian study it contradicts with the global range of 54.8% (Russia) to 88.6% (China) [21,22]. Our findings are also lower than COVID-19 vaccine acceptance figures reported for Nigeria from large global surveys. The largest survey was implemented by Facebook and the University of Maryland where over 12 million people (April 2021) were surveyed, data from the 4 countries with large sample sizes (South Africa, Kenya, Nigeria and Sudan) found an average of 68% of respondents would accept a COVID-19 vaccine [28]. It is likely that the greater proportion of young people in this study, who are more likely to access and be influenced by social media anti vaccination campaigns, had markedly contributed to the low acceptance levels reported. In addition, it is reported that older persons are more likely and willing to accept

COVID vaccination [29,30]. The influence of educational attainment also impacted on the acceptance level. This study found a positive correlation between tertiary education and acceptability of vaccine whereas only 40.7% of participants possessed at least tertiary education.

5. CONCLUSION

Although this is a hospital-based study in a stand-alone eye hospital, findings obtained suggest a need for urgent re-strategizing on the best possible way to re-enlighten the public especially the youths and widen the scope of information dissemination. Preferably, a greater youth and community involvement in the various aspects and levels of COVID-19 vaccination program will enhance acceptability and coverage.

ETHICAL APPROVAL

Ethical approval was sought from the Medical and Health Research Ethics Committee of the Nnamdi Azikiwe University Teaching Hospital (NAUTH) Nnewi.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

The authors declare that they have no competing interests.

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